CROP TALK

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Brought to You by the Following OMAFRA Crop Specialists

Mike Cowbrough Weed Management Program Lead
Hugh Martin, Organic Crop Production Program Lead
Horst Bohner, Soybean Specialist
Ian McDonald, Applied Research Co-ordinator
Albert Tenuta, Field Crop Pathologist
Keith Reid, Soil Fertility Specialist
Jack Kyle, Grazier Specialist
Brian Hall, Canola & Edible Beans Specialist
Peter Johnson, Cereals Specialist
Scott Banks, Emerging Crops Specialist
Gilles Quesnel, Field Crops, IPM Program Lead
Christine Brown, Nutrient Management Program Lead
Adam Hayes, Soil Management Specialist - Field Crops
Greg Stewart, Corn Industry Program Lead
Tracey Baute, Field Crop Entomology

Editor: *Joel Bagg, Forage Specialist*
Compiled by: Maggie Winn, OMAFRA, Lindsay

More Profit From Oats Using A Fungicide

by Scott Banks, Emerging Crops Specialist, OMAFRA

Oat leaf diseases, such as crown rust, can be very devastating to both yield and quality. The higher priced milling oat and horse oat markets require clean, high test weight oats. Farmers need a premium price as well as a descent yield in order to make a profit. If you are growing oats in southern Ontario, they need to be sprayed with a fungicide at the "flag-leaf emerged" stage of the oats to manage leaf disease. In northern Ontario, leaf diseases are less frequently an issue. Farmers should scout their fields as the oats approach the flag leaf emergence stage, monitor the progression of the disease and be prepared to apply a fungicide if conditions are favourable for leaf disease development.

Breakdown In Oat Variety Rust Tolerance

European buckthorn is the alternate host to oat leaf rust. Buckthorn is common in central and eastern Ontario, and over the years has proven almost impossible to control. In the past, oat variety breeders bred in genetic tolerance to rust. The use of rust resistant varieties was an effective tool in managing the disease. However, there are different races of the fungus and they change over time. As a result, the rust organism evolves to overcome the genetic tolerance in the previously resistant varieties and these varieties become susceptible. When there is no genetic tolerance, the plant can no longer fight the new rust organism. This genetic tolerance breakdown was particularly evident in fields that were not sprayed with a fungicide in 2008 and 2009 where rust significantly reduced the oat yields and quality.

Fungicide Application Benefits

A fungicide should be applied at flag-leaf emerged stage (Zadock 39). This stage is when the last leaf emerges from the stem before the head emerges (Figure 1). The application of fungicide at this stage can significantly improve both oat grain yield and quality

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(test weight and kernel colour), and reduce the risk of lodging (Figure 2). In a 2008 fungicide trial in eastern Ontario, there was a 20% yield increase with the use of a fungicide at the flag-leaf stage on a variety where the genetic rust tolerance has broken down.

Figure 1 – Flag Leaf Emerged Cereal Stage

Figure 2 - 2008 Fungicide Trial on Oats – Note lodging in unsprayed strips

Fungicide Products

There are several fungicide products available for control of leaf diseases in oats. Tilt 250E, Bumper 418 EC, Stratego 250 EC, and Headline EC can be used for crown (leaf) rust. For other diseases such as leaf blotch, Quilt can also be applied. The retail price of the fungicides ranges between $9 to $14 per acre plus application costs.

For more information about foliar disease control management strategies and available fungicide products refer to OMAFRA Publication 811, Agronomy Guide (p. 252) (www.omafra.gov.on.ca/english/crops/pub811/14cereal.htm) and Publication 812, Field Crop Protection Guide (p. 50-52) (www.omafra.gov.on.ca/english/crops/pub812/4ocrust.htm).

Scouting For Potato Leafhopper In Alfalfa

by Gilles Quesnel, Field Crop Integrated Pest Management Specialist, OMAFRA

Potato Leafhopper (PLH) is one of the most damaging alfalfa insect pests in Ontario. While PLH is seldom a problem on the first cutting of established alfalfa, the insect can start damaging new seedings by mid-June. The damage done by PLH is not as dramatic as that of an alfalfa weevil outbreak, but is more chronic and widespread. The injury often goes undetected and affected plants do not recover until the stems have been harvested. New seedings are particularly susceptible to PLH damage.

What To Watch For

Leafhoppers usually arrive in Ontario in late-May. Adults are 3 mm (1/8 inch) long, lime green and wedge-shaped. The juvenile leafhoppers or nymphs are about 0.8 mm (1/32 inch) long when they hatch. They resemble adults, but they are wingless and are often found on the underside of the leaves. Both the adults and nymphs feed on alfalfa. They insert their mouthparts into a leaf midrib and suck sap juices from the plant. PLH inject saliva containing a toxin into the plants as they feed. This distorts and blocks the tiny tubes that distribute nutrients within the plant. The result is the characteristic V-shape "hopperburn", which starts as a wedge-shaped yellowish pattern on the leaf tips. The alfalfa will be stunted and may also turn reddish. Most of the damage occurs from June to mid-August. High-risk factors include hot, dry seasons. Symptoms are sometimes confused with nutrient (boron) deficiency or herbicide injury. More commonly, symptoms are often dismissed as "drought damage."

Scout Before Damage Occurs

Economic losses occur before plant symptoms develop, so it is important to identify the presence of large leafhopper populations before the damage occurs. If leaf

yellowing has already occurred, it is too late to prevent damage to that cutting. Scouting with a sweep net will help you determine whether early harvest or spraying is needed. In new spring seedings, start scouting fields when the plants are 10 to 15 cm (4 - 6 inches) high. Scout at intervals of 5 to 7 days. In established stands begin scouting after first-cut when plant regrowth is 5 to 10 cm (2 to 4 inches) high.

To determine the number of leafhoppers present, including adults and nymphs, take 10 sweeps and divide by 10. Do this in 5 representative areas of the field and note the height of the alfalfa. Recommended action thresholds are as follows:

Recommended Action Thresholds	
Stem Height	**Average Leafhoppers per Sweep[1]**
9 cm (3.5 in.)	0.2 adults
15 cm (6 in.)	0.5 adults
25 cm (10 in.)	1.0 adults or nymph
36 cm (14 in.)	2.0 adults or nymph

[1] 1 sweep = 180° (half circle) sweep with the net.

Management Strategies

- Alfalfa varieties are available that are resistant to PLH. These varieties have glandular hairs, both on the leaves and stems, that act as mechanical barriers to PLH feeding. Varieties rated Highly Resistant (HR) to PLH include FSG400LH, TrailBlazer 4.0, WL345LH, and Pioneer 53H92 (www.goforages.ca).
- The glandular hairs are not fully expressed the first year, so treat new seedings of PLH-resistant varieties the same as regular alfalfa.
- When considering whether to use a PLH-resistant variety, include the level of PLH infestation expected in a typical year. PLH is typically more of a problem in the Lake Erie counties and Niagara area. Also consider the cost of scouting, insecticide and spraying, and the cost and performance traits of the PLH resistant variety, such as yield and disease resistance.
- Cutting alfalfa early will potentially reduce egg, nymph and adult populations. A naturally occurring fungal pathogen helps reduce the populations of the PLH under cool, moist conditions.

Refer to OMAFRA Publication 812, "Field Crop Protection Guide" and product labels for insecticide information.

Studying the Impact of Harvesting Crop Residues

by Bill Deen, Cropping Systems, Dept. of Plant Ag., University of Guelph, &
Ian McDonald, Applied Research Coordinator-Field Crops, OMAFRA

There is increased focus on the harvest of crop residues to address the increasing demand for biomass based feedstock to meet both traditional and non-traditional uses. To put this in perspective, we average about 1.8, 2.4 and 1.4 million acres of corn, soybeans and cereals in Ontario. Our experience in residue removal is limited primarily to cereal straw. Peter Johnson, Cereals Specialist, OMAFRA, estimates that we harvest about 60% of the cereal acres for straw each year. With the exception of some very small pockets in livestock country, we have zero experience with harvesting corn or soybean residue. This spring there was a lot more corn stover harvest spurred on by straw costs of 6-8 ¢/lb.

Interest In Crop Residues

There is an increasing interest in crop residues for use in:

- second generation ethanol (especially in the US),
- combustion fuel for electrical and heat production (coal replacement), and
- feedstock for emerging bioproduct opportunities.

This has caught a lot of groups off-guard with respect to the impact of harvesting this biomass will have on soil productivity and sustainability. With little interest in residue harvest in the past, very little research was conducted, mostly of short term duration (3 years). Soil organic matter levels change gradually in response to management. Negative effects of residue removal may not be immediately detected, but may manifest themselves gradually over time.

Impacts of Residue Removal

A recent review paper of scientific literature by Dr Humberto Blanco-Canqui of Kansas State University, explored all the research available on residue removal. He points out that excessive crop residue removal impacts crop productivity and long term sustainability by affecting soil properties, soil organic carbon dynamics, and water and wind erosion potential. Soil physical, chemical and biological properties are impacted and influence susceptibility to compaction, crusting, surface sealing, temperature and moisture modulation and retention, soil aggregation, macroporosity, aeration, nutrient cycling and availability, and biological activity. These impacts were measured across a range of soils and residue removal levels. The conclusions vary widely as to how much crop residue can be removed before negative effects are observed. Optimum removal rates vary with geography, climate, soil type, crop rotation,

tillage systems, and frequency of removal. Blanco-Canqui concludes that existing data suggests that only a small fraction of crop residues can be sustainably removed, and that these small amounts may not be economically feasible to harvest.

Research On New Production Systems

There is conflicting opinions across academics, extension personnel, producers and others on the benefits and risks of harvesting crop residues. Numerous research studies have been initiated across North America. These include investigating the biology, environmental, economic, and logistical aspects of crop residue harvest. Researchers are also trying to develop new production systems that would offset potential negative effects of crop residue removal. These include extended rotations that include perennial forages, cover crops, additional organic amendments and other strategies.

University of Guelph

In Ontario, a University of Guelph project is investigating the science and practicality of crop residue removal under our conditions of climate, soil, production systems and economics. The goal is to identify changes to present production systems that may enhance the sustainability and volumes of crop residues that could be harvested without reducing long term productivity of our soils.

Is Organic Still Growing?

by Hugh Martin, Organic Crop Production Program Lead, OMAFRA

What is the future and growth of organics? Twenty years ago people assumed that organic was just a fad and in a few months the consumer's interest in organic food would pass. At that time North American organic food sales were just over $1-2 billion per year. In 2009, retail sales of organic food were approximately $25 billion in the United States and $2 billion in Canada.

Growth In Organic Food Sales

Organic sales grew at 17 - 22% per year from the early-1990's to 2007. When the economic recession hit in late-2008, organic sales reduced in growth, but most sectors continued a lower level of steady growth. Fresh fruit and vegetables and fresh meats maintained the best growth, while processed foods grew the least. Overall growth in the US organic sector was over 5% in 2009.

Market Share

Organic foods have become a small but significant part of the mainstream marketplace. In the United States, 3.7% of all foods being sold are organic. In Canada, the market share is lower but considered to be over 2%. Up to 80% of our organic foods are imported compared to approximately 30% for all foods, due to limited organic farm production and food processing capacity. Organic farm production levels vary by commodity, but approximately 1.4% of our total farm production is organic. About 25% of the Ontario farm gate value of organic is fresh fruits and vegetables, 30% is grain and forage crops (for processed foods and livestock feeds), and 45% is livestock production (dairy, eggs, pork, beef, etc).

Consumer Demand

Organic food sales weathered the economic storm of 2008-9 reasonably well. From early indications, it appears that growth will improve in 2010. Consumers have proven that they want the choice of buying some organic products. About 5% of consumers are core organic consumers that chose to buy a significant amount of organic products. About 55% of consumers buy a few organic products that may be favourite products or may just be a new product on the shelf that catches their eye. Both groups continue to buy more when high quality organic products are available. Organic consumers also want to buy local organic products that are grown in Ontario.

Organic Production Opportunities

I have always said that organic production is not for everyone. Organic production systems require a high level of management that is information intensive, especially during transition period when learning the new production system. Do not underestimate the differences in the production systems. Marketing requires more effort and labour needs can increase. The transition to organic takes time and effort to learn a new production system, but is an investment in your future business.

When I visit organic farms and businesses in Ontario, I see good managers that are very successful and glad they made the change. I also see some managers who have not yet been able to put all the pieces together and their business is suffering. If you want to get into organic, take time to do your research and develop a good business plan on how to get there. Talk to other organic farmers who are successful and join some of the associations or attend their meetings and summer tours.

For more information refer to:
OMAFRA organic information - www.ontario.ca/organic
Ecological Farmers Association of Ontario – www.efao.ca
Canadian Organic Growers – www.cog.ca
Organic Council of Ontario – www.organiccouncil.ca.

What Makes A Successful Grazing Program?

by Jack Kyle, Grazing Specialist, OMAFRA

Promoting good grass growth is the most important part of a successful grazing program. Improved grass growth is critical to get the most livestock production from the pasture. If you manage the grass on your farm to get maximum growth and then optimize the harvest of this growth, you will achieve significant results. Productive pastures can produce 500 to 600 pounds of gain per acre.

With any annual crop we take great steps to get optimum growth and plant development. We select varieties, fertilize to crop needs and control pests. Harvest does not happen until the crop has reached the ideal harvest stage.

Let's think about these same things, but from a grazing or pasture perspective.

Species

How species are managed is as important as what species are present in the pasture. Species differ somewhat in their growth habits, but all species can provide both good quality and quantity of forage. Manage your pastures to the advantage of the species present. Grasses should initially be grazed when the third-leaf is fully emerged. This will be an earlier calendar date for orchard grass than brome grasses. Clovers and alfalfa will break winter dormancy early and be ready to graze shortly after the grasses. Trefoil is late to break winter dormancy and consequently is not going to provide pasture until late in the spring.

Fertility

Fertility is important for good plant growth. Grasses will respond to nitrogen applications in late spring. Livestock manure produced by the grazing animals assists in providing fertility. If evenly distributed across the pastures, this manure will enhance the forage growth.

Optimum Stage At Grazing

The optimum harvest time for pasture grasses is after the third-leaf has emerged and before the seed head has emerged. Harvesting at this time allows for the plant to accumulate significant livestock feed and replenish root growth and reserves. Once the grass has been grazed, then it is time to let it regrow until it has reached the third-leaf stage again. This re-growth will take about 25 to 40 days or more, depending on the season. The regrowth will be faster in the spring with the cooler temperatures and adequate moisture, and will be slower during the hot, drier summer.

Fence

A rotational grazing system allows you to manage the grass for optimum forage production. Consequently there will be significantly more forage for your livestock. When livestock are being moved to fresh forage on a regular 1-5 day basis, a single or double strand electric fence will be adequate to control your cattle. Fencing allows you to control your livestock and prevent the re-grazing that limits forage production. A well managed grazing system will provide productive pastures on your farm.

Is the Soybean Variety Important for Making Fungicide Application Decisions?

by Horst Bohner, Soybean Specialist, OMAFRA

Foliar fungicide application has sometimes shown increased soybean yields with an average yield response in Ontario of 2.2 bu/ac. However, only about 30% of the spray decisions produce a yield response that is economically beneficial to the producer. So far, no clear correlation to disease pressure, tillage practice, seed variety, or weather has been demonstrated to correlate to the level of yield response achievable with a fungicide application. Recent research in corn suggests that the yield response could be partially dependent on the hybrid. If some soybean varieties respond more than others, this information could be important in making economic management decisions.

A project being conducted by Chris Gillard at the University of Guelph is testing the response of 20 soybean varieties to Headline foliar fungicides. The varieties were carefully chosen based on different parentage and a range of observed disease resistances. Trials were planted in 2 locations and replicated 4 times in 2009. More sites will be set up in 2010 and 2011. Sites were located near Exeter and Chatham. Seed quality parameters investigated included oil, protein, seed size, and germination to determine if the fungicide had any impact on seed quality (on a scale of 1-5).

Soil samples were collected at planting time. Field sites were also assessed for disease and insect pressure.

Exeter

An overall average yield increase of 1.6 bu/ac was observed but no differences in variety response were measured. There was a significant seed weight difference for the Headline treated plots of 0.8 grams/100 seeds. No differences in Days to Maturity were measured. The visual seed quality was slightly better for the unsprayed than the Headline treated plots.

Chatham

No significant yield difference or variety effect was detected between treated or untreated plots. There was a 2 day delay in the maturity where Headline was sprayed. Seed quality was slightly better for the untreated. Seed weight was significantly better for the Headline treated plots by 1.0 gram/100 seeds.

This was Year 1 of a three year study so stay tuned for final results next year.

Table 1 - 2009 Results - Soybean Variety Yield Response To Foliar Fungicide, Year 1

		Exeter		Chatham	
	Variety	**Untreated (bu/ac)**	**Headline (bu/ac)**	**Untreated (bu/ac)**	**Headline (bu/ac)**
1	Secan #1 AM0908A5-DOYN	71.9	74.6	66.4	65.8
2	Secan #2 AM0808B3-DOYN	68.8	71.2	69.1	71.9
3	Secan RCAT MatRix	68.9	70.7	55.9	54.7
4	Secan RCAT MiRRa	66.6	67.9	58.8	60.0
5	Syngenta S14-A7	69.5	69.8	53.4	57.9
6	Syngenta S14-K6	65.9	70.7	59.6	60.8
7	Syngenta S17-A1	70.4	71.0	61.2	61.5
8	Syngenta S21-N6	70.1	71.8	65.2	71.0
9	Monsanto 8-60RY	71.4	71.4	70.3	70.0
10	Monsanto 28-61RY	71.9	75.6	71.5	66.0
11	Monsanto 29-60RY	73.8	76.2	71.7	71.8
12	Monsanto 31-10RY	77.0	75.0	77.3	75.9
13	Hyland RR Respond	69.8	68.3	68.5	70.0
14	Hyland RR Rodney	65.4	70.8	59.6	62.1
15	Hyland HR 12R42	68.1	72.2	57.9	62.6
16	Hyland HS 11R46	71.7	72.8	63.6	59.4
17	Pioneer 91M01	71.4	70.1	59.3	60.5
18	Pioneer 91M41	67.9	70.0	60.9	62.7
19	Pioneer 91Y90	70.7	70.2	67.2	68.3
20	Pioneer 92Y30	70.5	73.1	64.4	66.7

Should We Cut Hay In The Morning Or Afternoon?

by Joel Bagg, Forage Specialist, OMAFRA

Can hay nutrient quality and sugar content be improved by cutting in the afternoon rather than in the morning? There has been a great deal of conflicting information about AM/PM cutting in the farm media that has created some confusion and controversy.

The Case For Afternoon Cutting - Photosynthesis

During the day, forage plants convert sunlight into sugars by photosynthesis. Sugars and starch are produced faster than they can be translocated to root and crown reserves, so at the end of a sunny day, the plant sugar content is at its maximum. During the night, the plant continues translocating sugars from the leaves, and also uses up some of the sugars for respiration. As a result, the sugars contained in the harvestable forage will be at their minimum in the morning, before photosynthesis begins again. It therefore would seem reasonable that cutting late in the day would maximize the highly digestible non-structural carbohydrates (ie sugars and starches) and palatability of the hay. Some research has shown this to be the case.

The Case Against Afternoon Cutting – Plant Respiration

When a forage plant is cut, it doesn't know it's dead yet. It still thinks it has a fighting chance. Initially, plants on the top of the swath receiving sunlight will even try to continue photosynthesis, until limited by lack of moisture. Respiration using up soluble sugars continues until the plant is sufficiently dry that plant metabolism slows and eventually stops. The longer the drying period, especially the initial phase down to about 60-65% moisture, the greater the respiration losses.

It really doesn't matter to the cow what the sugars were at cutting. Forage quality is determined after harvest and storage at the feed bunk. Overnight respiration losses of sugars can be greater than what is gained by waiting to cut in the afternoon. Research has shown this to be the case in New York and Wisconsin. Confused?

Drying Conditions, Humidity & Night Time Temperatures

The conflicting research results appears to be related to climate and the weather during the drying time of the studies. Overnight respiration losses are greater with higher humidity and temperatures. The original research showing the benefits to afternoon cutting was conducted in the western US, including Idaho and Utah. These locations have ideal, fast drying conditions with low humidity and intense sunlight. Remember, this is the part of the world where they bale in the evening with some dew on to avoid excessive leaf loss. They also have cooler nights, which reduces respiration.

Ontario Hay Making Weather Can Be Challenging

Contrast this with Ontario and our neighbouring provinces and states, where we struggle with high humidity, warmer nights, and the ever present threat of rain. Our overnight respiration losses are potentially much greater. There is some research in the northeastern US and Quebec that shows some potential advantage to afternoon cutting. This is more likely with exceptionally good drying condition (sunny, low humidity, lower swath density, etc). For example, the typically faster drying conditions of a lighter second-cut with excellent July weather may improve the conditions where the added sugars more than offset the added respiration losses. However, in the real, on-farm world of Ontario haymaking, will this be consistent enough?

Cutting late in the day also adds another day to the necessary weather window of good drying without any rain. If you check our weather records, I doubt whether this is very often a good risk. Rain-damage, or advanced maturity from delayed cutting because the weatherman can't promise us the extra day, can easily offset any intended advantage. I'm not sure that Ontario farmers very often have the luxury of delaying cutting in an effort to potentially improve sugar content. Also, many farmers cut in the morning to spread the workload, because baling usually takes place in the afternoon.

Morning Cut "Haylage In A Day"

There is considerable interest in improving haylage quality by cutting in the early morning with wide swaths to speed wilting and then chopping it later the same day. Cornell University research shows this approach significantly improves fermentation and digestible energy. Even though sugars are at their minimum when cut in the morning, losses of these sugars to respiration are also minimized with rapid wilting and no overnight respiration losses. Similarly when making dry hay, cutting with a wide swath likely does more than cutting in the afternoon to improve forage digestible energy. (Refer to "Wide Swath Haylage" www.omafra.gov.on.ca/english/crops/facts/w_s_haylage.htm)

Bottom Line

In my opinion, the time of day to cut forage for dry hay, is when you've figured out you've got a good chance to get it made before the next rain. Unless you have excellent, extended drying conditions forecasted, this likely means cutting in the morning. For improved hay quality, dry it

and make it as fast as you can. Use the tools – cut a wide swath, condition properly, and make strategic use of tedding, rotary rakes, or windrow invertors. (Refer to "Making Marketable Hay Without Rain Damage Or Mould" www.omafra.gov.on.ca/english/crops/field/news/croptalk/2008/ct-0908a6.htm).

Making A Case For Summer Applied Manure

by Christine Brown, Nutrient Management Field Crop Lead, OMAFRA

A potentially early wheat harvest may make some producers decide that this is the year to apply manure or compost or non-agricultural sourced materials (NASM).

Before heading to the field, take a few minutes to take a sample of the material and think about the composition of the material being applied. What are the benefits? Are there risks? How can those risks be minimized?

Benefits

- Organic matter and nutrient benefit for the soil
- Reduced commercial fertilizer inputs,
- Feeding of soil bugs that help to improve soil health
- Little risk of compaction
- More time available (compared to spring or fall) to apply to fields further away from the storage.
- Opportunity to seed a cover crop to maximize soil health benefits.

Relative Risks of Solid and Liquid Manure

There are always a few risks. Summer is the best time to apply solid manure, especially manures that include bedding. Summer/fall weather conditions help soil organisms to mineralize the organic nitrogen the makes up the greater portion of solid manure, so that the nutrients are more available for the crop the following spring. The risks associated with solid manure, compost or NASM are lower than with liquids applied at this time of year. Solid broiler manure fits somewhere between liquid and solid manure types when evaluating nitrogen conversions.

Precautions With Liquid Manure or NASM

- During a sudden thunderstorm, liquid manure has a higher risk of runoff and for entering tile drains, especially in no-till cropping systems. Manure in tile drains can end up in rivers or streams, where the ammonia will kill fish. Runoff containing phosphorus is also a harmful in water sources. Pre-tillage or injection, so that earthworm and root channels are disturbed, will increase infiltration of liquids and nutrients, reduce odours, and can mix in seeded cover crop seed.

- Liquid manure has higher ammonium-N content. If liquids are surface applied to dry soils during the hot, lazy-hazy days of August, 75% of the ammonium portion could volatilize into the air. Odour complaints near residential areas would be likely. Incorporation will help, but liquid hog or poultry manures are best applied later in the season when soil and air temperatures are closer to 10 °C.

- Liquid manure has a higher ammonium-N content that converts quickly to nitrate-N under summer conditions.

- Nitrate-N can move with water. In a wet fall if there is no growing crop to take the nitrate-N, it will move below the root zone and potentially to tile drains or ground water. Either way, that nitrogen is not available for the crop the following year.

Combine With A Cover Crop

Where liquids are being summer applied, the addition of cover crops will help to prevent nitrate-N from moving below the root zone and help to hold the nutrients in "green" form. In some cases, such as oat cover crops, growth can be sufficient enough for a forage harvest. Nitrogen held in most cover crops, with the exception of red clover, is usually not accounted for in the N requirements of the following corn crop. More likely, it feeds the soil micro organisms, breaks down residue and builds a healthier soil.

Bottom Line

As manure is applied to those early harvested wheat fields, remember to take manure and soil samples, account for the additional nutrients applied when planning commercial fertilizer additions, and pay attention to the weather forecast.